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SB SAT @ AMSAT $ANS-187.01
SAREX QUITE ACTIVE ON STS-94

HR AMSAT NEWS SERVICE BULLETIN 187.01 FROM AMSAT HQ
SILVER SPRING, MD, JULY 06, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-187.01

The space shuttle astronauts have been quite active on SAREX since the launch of Columbia just a few short days ago. The launch of space shuttle Columbia occurred on time, in fact, 35 minutes prior to the initially planned July 1 launch time. Lift off (MET = 0) occurred at 18:02:00 UTC.

Seventeen schools, including one in the People's Republic of China, are scheduled to talk with the astronauts via Amateur Radio. During the earlier STS-83 mission, Columbia's premature return to Earth postponed all scheduled SAREX QSOs. Most of the schools on the earlier schedule remain on tap for this mission, which again carries the microgravity science lab. Three hams are among the STS-94 crew members.

Under the SAREX program, students at each of the selected schools ask questions of the astronauts during the contact. The primary goal of SAREX is to excite students' interest in science, math, technology and the U.S. space program. The Shuttle astronauts also perform voice and packet QSOs with hams on the ground.

STS-94 is a long duration shuttle flight where crew members are working in shifts around the clock. Shift team members are as follows:

RED TEAM
         Commander (CDR): Jim Halsell, KC5RNI
             Pilot (PLT): Susan Still
Mission Specialist (MS3): Donald Thomas, KC5FVF
Payload Specialist (PS2): Greg Linteris

BLUE TEAM
Mission Specialist (MS1): Janice Voss, KC5BTK
Mission Specialist (MS2): Michael Gernhardt
Payload Specialist (PS1): Roger Crouch

The SAREX Working Group has designated the following frequencies during the STS-94 mission.

     FM Voice Downlink: (Worldwide) 145.55 MHz FM
     FM Voice Uplink: 144.91, 144.93, 144.95, 144.97, and 144.99 MHz
     FM Voice Uplink: (Europe only) 144.70, 144.75, and 144.80 MHz
     FM Packet Downlink: 145.55 MHz
     FM Packet Uplink: 144.49 MHz

Officially, the SAREX hardware was to fly in Configuration B, which is voice only, battery operation. However, power conservation measures have been successful to date and mission control advised the SAREX team and the

astronauts to initiate use of the Packet Radio system. At the time this bulletin is being released, the packet system has not been confirmed to be active.

CALL SIGNS:
FM voice call signs: KC5RNI, KC5BTK and KC5FVF
FM packet call sign: W5RRR-1

The crew has great enthusiasm for the Shuttle Amateur Radio Experiment (SAREX) on STS-94. Case in point, MS3 Don Thomas, KC5FVF, set up the orbiting ham shack and completed nineteen random contacts BEFORE the "official" scheduled test pass.

"Columbia was calling CQ as they passed over the tip of Baja California. Don said I was the first contact with Columbia. Elevation here was only two degrees, but the signals were Q5 at 1629z" reported Dave Guimont, WB6LLO, via the SAREX e-mail list on Wednesday, July 2.

On Friday morning, July 4, the students of Crittenden Middle School of Mountain View, California quizzed CDR Jim Halsell, KC5RNI, via the AMSAT Telebridge Network through Gordon Williams, VK6IU, in Western Australia. Five questions were asked and answered. The students chanted in closing, "Happy Independence Day, Columbia!"

Just the day before, the Mountain View youths spoke with NASA Administrator Dan Goldin. Mr. Goldin was in town for the dedication ceremony of the new teacher's resource center at the NASA Ames Research Center. He expressed excitement regarding the student's upcoming SAREX contact with the shuttle astronauts and wished the students good luck.

Edgewater High School of Orlando, Florida made a direct contact on Orbit 32 using station KF4DKF set up at the school. The students interviewed MS1 Janice Voss, KC5BTK. AMSAT Representative Will Marchant, KC6ROL, reported from Houston, "Edgewater HS had a very nice contact with twelve questions asked and answered."

The Lexington Traditional Magnet School (callsign AE4PD) in Lexington, Kentucky spoke with MS2 Dr. Michael Gernhardt on Rev 35 through telebridge ground station N6IZW in San Diego. Dave Sublette, K4TO, for the school commented, "Most folks don't realize how much work you [NASA, AMSAT and ARRL] put into SAREX. Thank you!"

Late acquisition of the SAREX signal has been observed by terrestrial hams when the orbiter attitude was roughly "tail down, main engines forward" and the SAREX antenna in Window 1 (far leftmost from the pilot/commander seat perspective). If you don't hear Columbia shortly after your predicted rise time then patiently continue monitoring throughout the pass. Remember too that the crew is quite busy with the primary experiments.

QSL VIA: Send reports and QSLs to ARRL EAD, STS-94 QSL, 225 Main Street, Newington, CT 06111-1494, USA. Include the following information in your QSL or report: STS-94, date and time in UTC, frequency and mode (FM; voice or packet). In addition, you must also include a SASE using a large, business-sized envelope if you wish to receive a card.

Watch for the SAREX Working Group bulletins and sarex@amsat.org during the mission for late breaking news regarding SAREX operations.

[ANS thanks Pat Kilroy, WD8LAQ, AMSAT Development and Operations Team; and Frank H. Bauer, KA3HDO, AMSAT V.P. for Manned Space Programs, for these reports.]

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SB SAT @ AMSAT $ANS-187.02
MIREX/ SAREX QSO

HR AMSAT NEWS SERVICE BULLETIN 187.02 FROM AMSAT HQ
SILVER SPRING, MD, JULY 06, 1997
TO ALL RADIO AMATEURS BT
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The shuttle also had two successful opportunities to talk to fellow astronaut Mike Foale, KB5UAC, on the Russian Space Station MIR. Shuttle Commander Jim Halsell, KC5RNI, talked to Mike on MIR during both contacts. The first ship-to-ship SAREX/MIREX contact occurred on Saturday July 5 at 12:02 UTC (MET 003/18:49.) This contact was conducted over the Indian Ocean and lasted 30-45 seconds. The second MIR/Columbia conjunction occurred over the Pacific Ocean at 13:36 UTC (MET 003/19:34). Will Marchant of the AMSAT reported that this contact also lasted about 30 to 45 seconds. He stated that the shuttle crew could hear MIR for a lot longer due to MIR's better antenna and higher power radio. Pilot Susan Still reported observing MIR through binoculars while the ham radio contact was underway. Mr. Marchant, who was in the Customer Support Room of Mission Control during the two contacts, said "The shuttle crew was pretty excited about their contact on the Air-To-Ground communications loop". The crew shared this excitement with fellow astronaut Bill McArthur, KC5ACR, who was CAPCOM during the contacts.

[ANS thanks Pat Kilroy, WD8LAQ, AMSAT Development and Operations Team; and Frank H. Bauer, KA3HDO, AMSAT V.P. for Manned Space Programs, for this report.]

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SB SAT @ AMSAT $ANS-187.03
AMSAT-UK COLLOQUIUM 1997

HR AMSAT NEWS SERVICE BULLETIN 187.03 FROM AMSAT HQ
SILVER SPRING, MD, JULY 06, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-187.03

ANS has received this list of presentations and addresses to be given during the 1997 AMSAT-UK Colloquium.

Addresses by: Martin Sweeting OBE G3YJO, Professor of Satellite Engineering UoS, Chairman of AMSAT-UK; Ian Kyle, GI8AYZ, President of RSGB; Ray Soifer, W2RS.

Presentations:
P3D Ranging
- James Miller, G3RUH.
A new generation of UoSat Amateur Spacecraft - Chris Jackson, G7UPN (UoS).
A New Network Layer Protocol for a LEO Satellite Global Data Network
- Bao-zhong Cheng (UoS).
Optimising the LEO Satellite Communications Link Through Hybrid ARQ Techniques
- Valerie Chu (UoS).
On-Board Image Processing & Compression for Small Remote Sensing Satellites
- Peixin Hou (UoS).
38.4 Kbps Receiver Requirements - John Paffett (UoS).
Low Cost High Resolution Radar Altimetry Mapping by Micro/Mini Satellite
- Yuanxing Zheng (UoS).
The Station Program
 - Paul Willmott, VP9MU.
Microwave Measurements
- (RSGB Microwave Committee).

The Kettering Group: From Hobby to Profession/Obsession
- Geoff Perry, MBE.
In Orbit Measurement of Long Term Interference Within the "Little LEO" and Amateur VHF Bands
 - John Paffett (UoS).
Radio Astronomy, Practice & Problems
- Dr. John Ponsonby, University of Manchester (Jodrell Bank).
Latest State of P3D Integration & Launch Campaign
- Frank Sperber, DL6DBN, (AMSAT-DL).
Machinist Help Wanted !
- Fred Kennedy, ZL1BYP.
Phase-3D Construction (video); commentary by Ray Soifer W2RS
After Phase-3D, What ?
- Ray Soifer, W2RS.
Amateur Radio on the International Space Station
- R J C Broadbent (AMSAT-UK)
The Satgate Experience
 - Andrew Sellers, G8TZJ.
Single Event Effects in Commercial Memory Devices Operating in the Space Radiation Environment: A Decade of Research at Surrey
- Craig Underwood, G1WTW, (UoS).
 Spacecraft Autonomy via Probabilistic RAM (pRAM) Artificial Neural Networks
- Mike Oldfield (UoS) [Paper read by Craig Underwood, G1WTW,. (UoS)].
Computer Security, a Briefing
- Richard Limebear, G3RWL, (AMSAT-UK).

Experts panel
AMSAT-UK Annual General Meeting
On Friday evening and Saturday there will be microwave test equipment (and people who know how to use it) available for people to test their projects

[ANS thanks Richard W L Limebear, G3RWL, for this information.]

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SB SAT @ AMSAT $ANS-187.04
AMATEUR RADIO SATELLITE IMAGING

HR AMSAT NEWS SERVICE BULLETIN 187.04 FROM AMSAT HQ
SILVER SPRING, MD, JULY 06, 1997
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At the AMSAT-NA Symposium to be held in Toronto, Canada in October 1997 Graham Ratcliff, VK5AGR, is planning a presentation entitled 'Amateur Radio Satellite Imaging - The Past, Present and Future'.

In this presentation Graham plans to give a brief overview of Amateur Satellite imaging hardware that has already flown in the past, is currently operational and those currently under construction and awaiting launch plus a step-by-step description of what hardware and software is required to decode and display these Amateur Satellite images, especially aimed at those who have never attempted it before. In particular, VK5AGR, plans to demonstrate how to use WiSP ,by Chris Jackson, G7UPN, to collect the raw images from the 9600 baud satellites and CCD Display by Colin Hurst, VK5HI, to display the images and some post-processing software such as PaintShop Pro.

Ratcliff has been active collecting the 9600 baud satellite images and has many examples from UO-22, KO-23, KO-25 and PO-28. He also has kept copies of any images from WEBERSAT-OSCAR-18.

[ANS thanks Graham Ratcliff, VK5AGR, for this information.]

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SB SAT @ AMSAT $ANS-187.05
FIFTH ANNUAL JEWELRY CONTEST

HR AMSAT NEWS SERVICE BULLETIN 187.05 FROM AMSAT HQ
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Announcing The Fifth Annual Jewelry Contest to take place at the AMSAT convention in Toronto in October of 1997. This years prize is a device that your lady will use to assist her in fastening a bracelet on her wrist. Leanore, KA6UCD, will have it at the convention; she will be happy to demonstrate it at any time.

The accompanying brademo.gif shows the "third hand bracelet fastener" being used. Thrdhand.gif is a picture of the device. An alligator clip is the "third hand".

Your problem, should you decide to take the assignment, is to estimate the frequency of the open stub, from which the handle is made.

It is an open, half wave stub constructed from 50 ohm .141 teflon insulated hardline that has a velocity factor calculated at 70.8%. The inside diameter of the coil is .5 inches; the 3 3/4 turns is 5 3/4" overall. The formed coil has absolutely no effect on the frequency, and the frequency is in an amateur satellite band. The SMA connector on the end will enable you to check the frequency when you win. NO measuring equipment other than a ruler is permitted.

The frequency has been determined accurately to two decimal places, but for contest purposes the "correct" answer has been carried out to six places to provide a tie-breaker. Please submit your answer in MHz. Leanore will have a supply of entry slips.

ALL are eligible to enter. Take your significant other to Toronto, and get two chances to enter the contest. THIS IS A FUN THING. In the event you will not be attending the convention be sure to get your answers to Leanore or Dave by the 10th of October.

The winner will be announced at the banquet, but you need not be present to win.

Look for a depiction at toron5.zip at
http://users.aol.com/dguimont
or on the digital birds.

[ANS thanks Dave Guimont, WB6LLO, for this report.]

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SB SAT @ AMSAT $ANS-187.06
WEEKLY SATELLITE REPORT PT 1

HR AMSAT NEWS SERVICE BULLETIN 187.06 FROM AMSAT HQ
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MIR:
Mike Foale, KB5UAC, has been active on amateur radio.. The radio has served as a valuable link between Mike and his family and friends during

this crisis . Also activity from the MIR packet station has been reported.
Frequencies with activity have been 145.985 MHz and the 145.200/800 MHz
split.

SAFEX, MIR 70 cm Repeater
(Uplink 435.750 MHz FM, Downlink 437.950 MHz FM,
Subaudible tone 141.3 Hz)
Not operational at this time..

RS-10
(Uplink 145.865-145.905 MHz CW/SSB, Downlink 29.36-29.4 MHz CW/SSB)
RS-10 Still silent.
RS3A needs some SWL reports of RS-10.
What time you heard RS-10, and also the date.
Send info via packet to Andy, .RS3A.
Packet: RK3KPK@RA3KP.MSK.RUS.EU

RS-12
(Uplink 21.21-21.25 MHz CW/SSB, Downlink 29.41-29.45 MHz or
145.91-145.95 MHz CW/SSB)
Operational.

RS-15
(Uplink 145.858-145.898 MHz CW/SSB, Downlink 29.354-29.394 MHz CW/SSB)
Operational.
WT0N reports that downlink signals are still weak from RS-15,
but the bird is still workable.
(Hint: If SSB doesn't work for you, try CW. CW is very easy
to hear on the downlink!)

RS-16
RS-16's 435.504 MHz beacon is active. Also,
the 29.408 MHz beacon is reported as being heard.
No transponder activity yet.
RS-16 CW Telemetry.
P   PSU voltage Volts..... x0.1
O   Solar panel voltage Volts..... x0.1
N   Solar panel current mA
M   TX 29 MHz Output Power mW..... x10
L   TX 29 MHz current mA
K   TX 29 MHz voltage 7V nominal
J   TX 435 MHz Output Power mW..... x10
I   TX 435 MHz current mA
H   TX 435 MHz voltage V..... x0.1
G   U of the transponder V..... x0.1
F   U of stabilizer V..... x0.1
E   Temperature of the charger in C deg.
D   Temperature TX 29 MHz in C deg.
C   Temperature TX 435 MHz in C deg.
B   Temperature RX 145 MHz in C deg.
A   Temperature of the stabilizer in C deg.
Parameters M, L, J, I are valid in FM mode only!

Transponder information on RS-16.
Uplink = 145.915 - 145.948 MHz
Downlink = 29.415 - 29.448 MHz
Beacons = 29.408 , 29.451 MHz
Pwr 29 MHz Down = 1.2 W /4 W

Beacon 1 = 435.504 MHz
Beacon 2 = 435.548 MHz
Pwr 435 MHz Beacons = 1.6 W

FO-20

(Uplink 145.9-146.0 MHz CW/LSB, Downlink 435.8-435.9
MHz CW/USB)
Operational. FO-20 in mode JA continuously
[ANS thanks Kazu Sakamoto, JJ1WTK, for this report.]

KO-23
(Uplink 145.85, 145.9 MHz FM, Downlink 435.175 MHz FM,
9600 Baud FSK.)
KO-23 operating normally.

KO-25
(Uplink 145.980 MHz FM, Downlink 436.5 MHz FM,
9600 Baud FSK.)
KO-25 operating normally.
[ANS thanks Jim Weisenberger, AA7KC, for his reports on
KO-25 and KO-23.]

AO-27
(Uplink 145.85 MHz FM, Downlink:
 436.792 MHz FM (As of April 1, 1997)
Operating normally.
AO-27 (1-Jun-1997- 10:58 UTC Orbit-19182)
The satellite is working normally over North America.
and Europe.
Current AO-27 schedule information can be found at
 www.umbra.com
[ANS thanks Michael Wyrick, N4USI, AO-27 Control-op, for this update.]

FO-29
Voice/CW Mode JA
(Uplink 145.9-146.0 MHz CW/LSB, Downlink 435.8-435.9 MHz CW/USB)
Digital Mode JD
(Uplink 145.85, 145.87, 145.910 MHz FM, Downlink 435.910 MHz FM 9600 baud
BPSK)
Operational.
The latest FO-29 Schedule.
July 4 (Fri)   09:13z Digi-talker
July 8 (Tue)   09:05z JA
July 11 (Fri)   09:51z JD1200
July 18 (Fri)   00:20z JD9600
July 25 (Fri)   09:23z JA
Aug   1 (Fri)   08:17z JD1200
Aug   8 (Fri)   00:30z JD9600
Aug 15 (Fri)   01:08z JA
Aug 22 (Fri)   08:26z JD1200
Aug 29 (Fri)   00:40z JD9600
Sept 5 (Fri)   01:18z JA
Sept 12 (Fri)   00:13z JD1200
Sept 19 (Fri)   00:51z JD9600
Sept 26 (Fri)   08:09z JA
[ANS thanks Kazu Sakamoto, JJ1WTK, for this report.]

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SB SAT @ AMSAT $ANS-187.07
WEEKLY SATELLITE REPORT PT 2

HR AMSAT NEWS SERVICE BULLETIN 187.07 FROM AMSAT HQ
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BID: $ANS-187.07

AO-10
 (Uplink 435.030-435.18 MHz CW/LSB, Downlink 145.975-145.825 MHz

CW/USB)
Operational.

OSCAR-11
(Downlink 145.825 MHz. FM, 1200 Baud PSK. Beacon 2401.500 MHz..)
Operating normally.
The beacon on 2401.500 heard over Spain on 23rd of June and also on
24th, but with weak signals.
[ANS thanks Saludos de Antonio, EA1IW/EA4, for this report.]

The operating schedule is unchanged.
ASCII status (210 seconds)
ASCII bulletin (60 seconds)
BINARY SEU (30 seconds)
ASCII TLM (90 seconds)
ASCII WOD (120 seconds)
ASCII bulletin (60 seconds)
BINARY ENG (30 seconds)

[ANS thanks Clive Wallis, G3CWV, for this information.]

AMSAT-OSCAR-16 (PACSAT)
(Uplink 145.9, 145.92, 145.94, 145.86 MHz FM, 1200 bps Manchester FSK
Downlink 437.0513 MHz SSB, 1200 bps RC-BPSK 1200 Baud PSK.
Beacon 2401.1428 MHz.)
Operational.
Graphic information about WOD/Telemetry values can be found at:
http://www.arrakis.es/~ea1bcu/wod.htm
[ANS thanks Miguel A. Menendez, EA1BCU, for this report.]

DO-17(DOVE)
(Downlink 145.825 MHz FM, 1200 Baud AFSK.
Beacon 2401.220 MHz.)
No report available.

WEBERSAT (WO-18)
(Downlink 437.104 MHz SSB, 1200 Baud PSK AX.25.)
No report available.

LUSAT-OSCAR-19
(Uplink 1200 bps Manchester FSK Uplinks:
145.84, 145.86, 145.88, 145.9 MHz FM, Downlink 437.125 MHz SSB,
1200 bps RC-BPSK.)
Operational.
Telemetry data received from LO-19:
uptime is 738/09:21:49. Time is Fri Jun 27 23:26:59 1997
Graphic and general information about Telemetry values can be found at:
http://www.arrakis.es/~ea1bcu/lo19.htm
[ANS thanks Miguel A. Menendez, EA1BCU, for this report.]

UO-22:
(Uplink: 145.9 or 145.975 MHz FM. Downlink 435.120 MHz FM
9600 Baud FSK.)
No report available.

IO-26 (ITAMSAT)
(Uplink 145.875, 145.9, 145.925, 145.95 MHz FM, Downlink 435.822 MHz SSB,
1200 Baud PSK.)
No report available.

[Please send your Satellite or News reports to ANS Editor B.J. Arts, WT0N,
via e-mail, at bjarts@the-bridge.net or to wt0n@amsat.org]

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